



Miltenyi Biotec

CRONUS laser

Expanding the possibilities of multiphoton microscopy

The CRONUS laser is a femtosecond laser with three synchronized outputs for multiphoton microscopy. With its two tunable (680–960 nm, 960–1300 nm) and one fixed (1025 nm) output channels it allows a free choice of fluorophores for multiphoton microscopy.

- Simultaneous excitation of fluorescent probes, calcium indicators or opsins right at their spectral absorption maxima
- Parallel use of label-free techniques with appropriate wavelengths
- Compact and cost efficient

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Specifications and dimensions

| | Wavelength range (nm) | | | | | Simultaneous excitation of two fluorophores | GFP excitation maximum covered | Combined imaging and optogenetics | Cost efficiency |
|--|-----------------------|-----|------|------|------|---|--------------------------------|-----------------------------------|-----------------|
| | 600 | 800 | 1000 | 1200 | 1400 | | | | |
| CRONUS laser | | | | | | + | + | + | + |
| Ti:sapphire + OPO | | | | | | + | - | + | + |
| Broad band (dual option) | | | | | | - | + | - | + |
| Broad band + Ti:sapphire (dual option) | | | | | | + | + | + | - |

Table 1: Application features of CRONUS laser compared with conventional laser systems used for multiphoton microscopy.

| | Optical output A | Optical output B | Optical output C |
|--|---|--|---------------------------------------|
| Tuning range | 680–960 nm | 960–1300 nm | 1025 nm (fixed) |
| Average power | >700 mW | >700 mW | >800 mW |
| Pulse width ¹⁾ | <160 fs | <160 fs | <160 fs |
| Repetition rate | 76.8 MHz ±1 MHz | 76.8 MHz ±1 MHz | 76.8 MHz ±1 MHz |
| Noise ^{2),3)} | <0.5% | <0.5% | <0.5% |
| Stability ^{3),4)} | <±1% | <±1% | <±1% |
| Spatial mode | TEM ₀₀ M ² <1.2 <1 | TEM ₀₀ M ² <1.2 <1 | TEM ₀₀ M ² <1.2 |
| Beam divergence, full angle | <1 mRad | <1 mRad | <1.5 mRad |
| Beam diameter (1/e²) | 3.0 mm ±0.4 mm | 3.2 mm ±0.4 mm | 2.8 mm ±0.4 mm |
| Beam roundness | 0.8–1.2 | 0.8–1.2 | 0.8–1.2 |
| Beam pointing stability ⁵⁾ | <200 μRad | <200 μRad | - |
| Pre-compensation GDD range | 700 nm: -10,000 to -35,000 fs ² 800 nm: -3,000 to -20,000 fs ² 950 nm: 0 to -10,000 fs ² | 960 nm: 0 to -10,000 fs ² 1100 nm: -3,000 to -10,000 fs ² 1300 nm: -6,000 to -12,000 fs ² | - |
| Power consumption | 1100 W (power supply), 900 W (chiller) | | |

1) determined with sech²-shaped pulse; 2) rms noise measured in 100 Hz to 10 MHz bandwidth; 3) tunable wavelengths 850, 1050, and fixed 1025 nm; 4) percent rms power drift in any 2 h period with less than ±1 °C temperature change after 1 h warm up; 5) entire beam pointing deviation through wavelength tuning and GDD tuning range

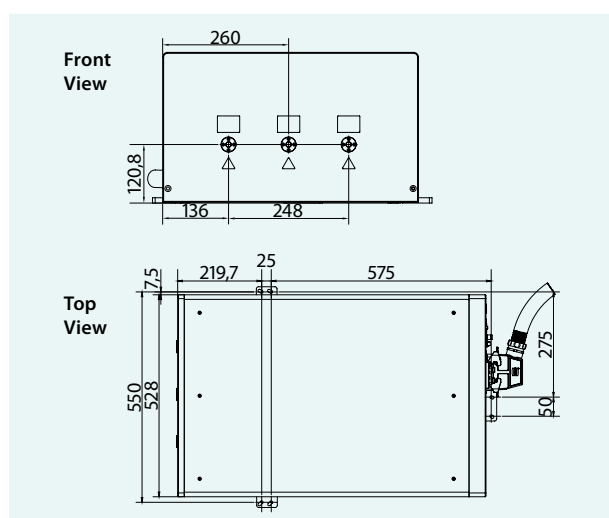


Figure 1: Dimensions of the CRONUS laser. Front view, from left to right: output A, B and C.

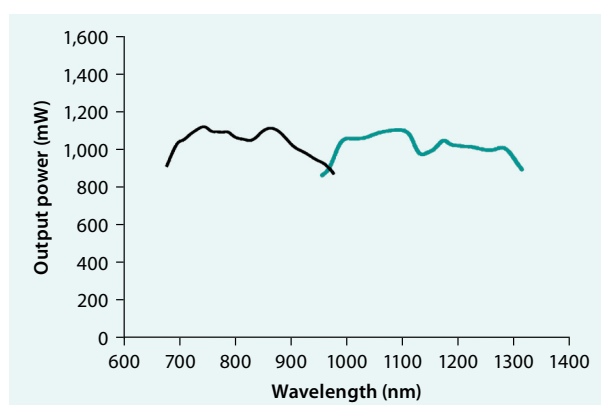


Figure 2: Typical CRONUS laser tuning curve for output A (black curve) and output B (teal curve).

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